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EUROPEAN PINE SHOOT MOTH SURVEYS

IN THE

PACIFIC NORTHWEST IN 1964

By

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INTRODUCTION

The European pine shoot moth, Rhyacionia buoliana (Schiff.), is a serious enemy of young pines in Europe and eastern North America. The larvae of this moth mine the buds and shoots of young trees, inhibit growth, causing deformation of the tree.

The shoot moth was discovered in the western United States at Bellevue, Washington in 1959. A partial survey of Oregon and Washington in 1960 revealed that the moth then had a firm foothold in the Puget Sound area. Local outbreaks were found in Spokane, Washington and in nurseries at Salem and Portland, Oregon.

During 1961, a survey was made to locate and eradicate all infested pines outside the heavily infested area around Puget Sound. By preventing the spread of the moth from the known zone of infestation, high-value pine stands in eastern Oregon and Washington would be protected. Infested trees, found in Spokane, Salem, and Portland, were cut and burned. Complete surveys of these areas in 1962 located 18 additional trees containing the moth in Portland but no infested trees were found in Salem or Spokane.

Surveys have been made the last three years in selected towns in Oregon and Washington. In Washington, infested pines were found at Chehalis and Menlo Park in 1961 and at Aberdeen, Washington in 1962. The infested trees in these communities were removed and destroyed. No infested trees were found in 1963. All known infested trees are within a containment zone around Puget Sound encompassing all of Whatcom, Skagit, Snohomish, King, San Juan, Island, Kitsap, and Mason Counties and parts of Clallam, Jefferson, Grays Harbor, Thurston, and Pierce Counties.

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MISSOULA, MONTANA

The State of Washington quarantine orders prohibit the movement of untreated pines from the containment zone into other counties of the State. The States of Oregon, Idaho, California, Montana, Utah, Nevada, and Hawaii also have quarantines prohibiting the movement of pines into their States from the infested area, unless the trees have been fumigated with methyl bromide in an approved manner.

PURPOSE OF SURVEYS

During the spring of 1964, Oregon Department of Forestry will examine all pine trees in areas adjacent to nurseries and properties in Portland where infested pines were destroyed in 1961, 1962 or 1963. The Washington State Department of Natural Resources will conduct a similar survey in the Spokane Valley in and around the locations where infested trees were found and destroyed in 1961. The purpose of these surveys will be to determine if the eradication program was successful.

U. S. Forest Service crews will survey major communities in western Oregon and Washington during the summer of 1964. The objective of the survey will be to detect any spread of the shoot moth from the containment zone around Puget Sound to previously uninfested areas. Spot checks will be made within the containment zone to determine the moth's rate of spread within the zone.

A survey will be made by Forest Service crews in lodgepole pine stands at Shelton, Washington, and elsewhere west of the Cascades. The objective of this survey will be to determine if the shoot moth has become established in the lodgepole pine.

Nursery inspectors of the Washington and Oregon States Department of Agriculture and the Agricultural Research Service, U. S. Department of Agriculture, will continue to examine pines in tree nurseries throughout both States. Forest Service crews will examine small sales outlets and small nurseries encountered during their regular survey activities.

The Insect and Disease Control Branch, Division of Timber Management, Pacific Northwest Region, U. S. Forest Service, will provide entomological assistance in planning and conducting these surveys as needed. This plan sets forth guidelines so these surveys may be carried out in an efficient manner.

TRAINING

A training session on all entomological phases of the survey will be held for survey personnel prior to the start of field work. Survey crews will receive the following training:

1. History of the European pine shoot moth in Europe, eastern North America, and the Pacific Northwest.--A review of the life cycle, damage that has occurred, and potential damage should the moth become established in native pine stands. Discussion on the importance of the surveys and how they are related to the over-all control program.

2. Identification of the European pine shoot moth in all stages, with emphasis on the larval stage.--Use of live and preserved larva, mounted moths, photos, slides, and Riker mounts.

3. Recognition of the shoot moth by its damage.--Use of infested shoots, Riker mounts, photos, and slides.

4. Identification of host trees.--Use photos, slides, and clippings from various species of pines. A field trip to an aboretum to study the various species of pines and other trees that pines may be confused with will be arranged.

5. A field trip to an area infested with the shoot moth to study the damage and characters that may be observed in lightly infested trees. Each man will collect and preserve in alcohol several shoot moth larvae for future study.

6. Other types of insect damage that may be encountered will be pointed out and contrasted with shoot moth damage.

7. A small scale survey will be conducted in an area containing infested pines. Collections of infested shoots will be made, labels filled out, and samples packaged.

SURVEY PROCEDURE

Trees to be examined

The European pine shoot moth is known to attack only pine trees. Since 32 species of pines are susceptible to the moth's attack, it will be necessary to examine every pine species encountered on the survey area.

Examination of tree

Every bud on the tree will be closely examined. If the tree being examined is tall and close to an infested tree, a ladder will be used and all buds will be examined.

The time required to examine a tree will vary with species, size, location, and number of buds. Special care should be taken in the examination of trees planted since the last survey of the area. Care must be taken to prevent needless damage to the tree in the course of the examination, but all buds that appear to contain larvae will be investigated regardless of damage to tree.

Collection of infested material

The following procedures will be followed when a tree is suspected of harboring shoot moth or shows signs of old shoot moth damage:

1. The surveyman will notify his foreman.

2. The surveyman and the foreman will examine the tree together.

3. If it is possible, 5 or 6 twigs showing evidence of the insect or its damage will be clipped and placed in a plastic bag. When clipping these shoots, remove at least 6 inches of the twig.

4. All material collected from a tree should be placed in a separate plastic bag. If it is necessary to use more than one bag, be sure to tie the necks together with a rubber band.

5. Care should be taken during the examination not to disturb or injure the larvae or pupae in the shoots. If any are injured, they should be placed in a vial of 70 percent alcohol and put in the bag with the twig from which it was removed.

6. Fill out a collection form in full and place it inside the bag with the sample. Be sure the address is correct. Use soft pencil.

7. Seal the plastic bag with a rubber band. Do not tie the neck of the bag.

8. Each tree from which a collection is made will be tagged. This tag will be numbered the same as the number on the collection form.

9. Place the bag in a safe location in the car where it will not be crushed or be in the sunlight. During hot weather, leave the plastic bags in the shade until you leave the area.

10. The crew leader is responsible for submitting daily collections to the biologist.

11. If collections are made from more than one tree on the same property, designate each tree clearly on the collection forms and tree tags so as to avoid confusion during a re-examination.

Examination of Collections

During surveys, any collections made from pines believed to be infested will be examined by the survey biologist. Suspect specimens will be examined by an entomologist. Immature insects, determined not to be

shoot moth, may be reared for identification. Should any shoot moth be found, specimens collected from these infested trees will be sent to Mr. Weisman at the U. S. National Museum for confirmation on the identification.

SCHEDULE

The following communities will be surveyed in 1964 by Forest Service crews in Oregon and Washington in an effort to determine if the European pine shoot moth is present or absent.

1964 European Pine Shoot Moth Surveys in Washington

Priority 1

Any town within three miles of an area from which the moth is believed to have been eradicated.

No.	Location	Town	Last Survey	Man Days Needed	Type Coverage
1	E 2	Aberdeen	1963	5	Full
2	G 3	Castle Rock	1963	½	Full
3	F 3	Centralia	1963	4	Full
4	F 3	Chehalis	1961	4	Full
5	F 2	Raymond	1963	2	Full
6	D 4	Suquamish	1963	1	Full

Priority 2

Any town within 15 miles of an area from which the moth is believed to have been eradicated.

No.	Location	Town	Last Survey	Man Days Needed	Type Coverage
1	M 4	Camas	1963	2	Full
2	E 2	Central Park	1963	1	Full
3	E 2	Cosmopolis	1963	1/2	Full
4	E 2	Hoquiam	1963	2	Full
5	E 2	Montesano	1963	2	Full

Priority 2 (Continued)

No.	Location	Town	Last Survey	Man Days Needed	Type Coverage
6	F 2	South Bend	1963	2	Full
9	H 3	Vancouver	1963	30	Full

Priority 3

Towns outside containment zone but within 25 miles of known infested trees.

No.	Location	Town	Last Survey	Man Days Needed	Type Coverage
1	E 4	Fort Lewis	1963	2	Part
2	E 3	Lacey	1963	3	Full
3	E 3	McCleary	1963	1	Full
4	E 3	Olympia	1963	5	Full
5	E 4	Tillicum	1963	1/2	Full
6	E 3	Tumwater	1963	1/2	Full

Priority 4

Towns on main roads leading out from infested area, which were not surveyed in 1963.

No.	Location	Town	Last Survey	Man Days Needed	Type Coverage
1	F 3	Fords Prairie	None	1	Full

Priority 5

Towns on main roads leading out from known infested areas.

No.	Location		Town	Last Survey	Man Days Needed	Type Coverage
1	D	7	Cashmere	1963	2	Full
2	C	7	Chelan	1963	2	Full
3	E	6	Cle Elum	1963	2	Full
4	E	6	Ellensburg	1963	5	Full
5	E	3	Elma	1963	1-1/2	Full
6	G	3	Kelso	1963	3	Full
7	D	6	Leavenworth	1963	1	Full
8	G	3	Longview	1963	6	Full
9	B	8	Okanogan	1963	2	Full
10	B	8	Omak	1963	5	Full
11	A	8	Oroville	1963	1	Full
12	B	9	Republic	1963	1	Full
13	E	6	Roslyn	1962	1/2	Full
14	B	8	Tonasket	1963	1/2	Full
15	D	7	Wenatchee	1963	10	Full
16	F	7	Yakima	1963	12	Part

Priority 6

Towns over 1,000 population which have never been surveyed and are not in containment zone.

None

Priority 7

Towns within 100 miles of a known infestation of E.P.S.M.

No.	Location	Town	Last Survey	Man Days Needed	Type Coverage
1	F 4	Morton	1963	1/2	Full

Priority 8

Towns over 100 miles from a known infestation. Some of these towns will be surveyed if time is available.

No.	Location	Town	Last Survey	Man Days Needed	Type Coverage
1	G 8	Benton City	1962	1/2	Full
2	G 3	Castle Rock	1962	1/2	Full
3	D 10	Cheney	1962	1 1/2	Full
4	C 10	Chewelah	1962	1	Full
5	F 11	Clarkston	1962	1 1/2	Full
6	E 11	Colfax	1962	1 1/2	Full
7	G 9	College Place	1962	1	Full
8	B 10	Colville	1962	1	Full
9	C 9	Coulee Dam	1962	1/2	Full
10	D 10	Davenport	1962	1/2	Full
11	F 10	Dayton	1962	1	Full
12	C 11	Deer Park	1962	1/2	Full
13	E 8	Ephrata	1962	1 1/2	Full
14	C 1	Forks	1963	2	Full
15	H 6	Goldendale	1961	2	Full
16	C 9	Grand Coulee	1962	3/4	Full
17	G 7	Grandview	1961	1 1/2	Full

Priority 8 (Continued)

No.	Location		Town	Last Survey	Man Days Needed	Type Coverage
18	F	7	Granger	1961	1/2	Full
19	G	3	Kalama	1962	1/2	Full
20	G	8	Kennewick	1963	5	Full
21	D	10	Medical Lake	1962	1/2	Full
22	E	8	Moses Lake	1962	3	Full
23	C	11	Newport	1962	1	Full
24	D	9	Odessa	1962	1/2	Full
25	F	8	Othello	1962	1 1/2	Full
26	G	8	Pasco	1962	4	Spot
27	F	11	Pomeroy	1962	1/2	Full
28	G	8	Prosser	1962	1 3/4	Full
29	F	11	Pullman	1962	4	Spot
30	E	7	Quincy	1962	1 3/4	Full
31	G	8	Richland	1963	2	Spot
32	E	9	Ritzville	1963	2	Spot
33	F	6	Selah	1962	1	Full
34	D	8	Soap Lake	1962	1/2	Full
35	G	7	Sunnyside	1963	1	Spot
36	F	7	Toppenish	1962	2	Full
37	F	7	Union Gap	1962	1/2	Full
38	G	10	Waitsburg	1962	1/4	Full
39	G	10	Walla Walla	1962	13	Full
40	F	7	Wapato	1962	3/4	Full

Priority 8 (Continued)

No.	Location	Town	Last Survey	Man Days Needed	Type Coverage
41	D 7	Waterville	1962	1/4	Full
42	G 8	West Richland	1962	1 1/2	Full
43	H 5	White Salmon	1962	3/4	Full
44	D 9	Wilbur	1962	1/2	Full
45	G 3	Woodland	1961	1	Full
46	F 7	Zillah	1961	1/2	Full

Priority 9

Towns in the zone of infestation which are not known to be infested. These towns will be spot checked during the rate of spread survey.

No.	Location	Town	Last Survey	Man Days Needed	Type Coverage
1	C 4	Alderwood Manor			
2	E 4	Algona			
3	B 4	Anacortes			
4	C 4	Arlington			
5	E 4	Black Diamond			
6	A 4	Blaine			
7	D 4	Bremerton			
8	E 4	Buckley			
9	B 4	Burlington			
10	C 5	Darrington			
11	E 4	Enumclaw			
12	A 4	Ferndale			
13	D 4	Gig Harbor			
14	D 4	Issaquah			

Priority 9 (Continued)

No.	Location		Town	Last Survey	Man Days Needed	Type Coverage
15	D	4	Kennydale			
16	D	4	Kent			
17	C	4	Lake Stevens			
18	C	4	Lakewood			
19	C	4	Lowell			
20	A	4	Lynden			
21	D	4	Lynwood			
22	C	4	Marysville			
23	E	4	Milton			
24	C	5	Monroe			
25	D	4	Mountlake Ter.			
26	C	4	Mukilteo			
27	C	4	Oak Harbor			
28	E	4	Orting			
29	E	4	Parkland			
30	C	4	Pinehurst			
31	C	3	Port Angeles			
32	D	4	Port Orchard			
33	C	3	Port Townsend			
34	D	4	Poulsbo			
35	E	4	Puyallup			
36	D	4	Redmond			
37	D	4	Riverton Heights			
38	B	4	Sedro Woolley			

Priority 9 (Continued)

No.	Location	Town	Last Survey	Man Days Needed	Type Coverage
39	C 3	Sequim			
40	D 4	Silverdale			
41	C 4	Snohomish			
42	D 5	Snoqualmie			
43	D 5	Snoqualmie Falls			
44	E 4	Spanaway			
45	C 4	Stanwood			
46	E 3	Steilacoom			
47	D 4	Tukwila			

Priority 10

No.	Location	Town	Last Survey	Man Days Needed	Type Coverage
1	E 4	Auburn			
2	D 4	Bellevue			
3	B 4	Bellingham			
4	D 4	Bothell			
5	D 4	Burien			
6	D 4	Des Moines			
7	D 4	Edmonds			
8	D 4	Federal Way			
9	E 4	Fircrest			
10	D 4	Kirkland			
11	D 4	Mercer Island			
12	D 4	Midway			
13	D 4	McMicken Heights			

Priority 10 (Continued)

No.	Location		Town	Last Survey	Man Days Needed	Type Coverage
14	D	4	Renton			
15	D	4	Richmond Beach			
16	D	4	Seattle			
17	E	3	Shelton			
18	E	4	Sumner			
19	E	4	Tacoma			

1964 European Pine Shoot Moth Survey in Oregon

Number	Location		Town	Last Survey	Man Days Needed	Type Coverage
1	D	2	Albany	1963	3	Full
2	B	8	Arlington	None	1	Full
3	H	3	Ashland	1963	5	Full
4	A	1	Astoria	1963	5	Full
5	F	1	Bandon	1961	2-1/2	Full
6	B	3	Beaverton	1961	5	Full
7	E	4	Bend	1963	6	Full
8	H	1	Brookings	1960	1	Full
9	F	7	Burns	1962	1	Full
10	G	2	Canyonville	None	1	Full
11	A	2	Clatskanie	1963	1/2	Full
12	F	1	Coos Bay	1963	4	Full
13	F	1	Coquille	1961	2-1/2	Full
14	D	2	Corvallis	1963	5	Full
15	E	2	Cottage Grove	1962	1	Full
16	E	2	Eugene	1963	17	Full
17	E	1	Florence	1961	2	Full
18	G	1	Gold Beach	1961	2	Full
19	G	2	Grants Pass	1963	2	Full
20	B	7	Hermiston	1963	2	Full
21	B	2	Hillsboro	1962	20	Full
22	B	4	Hood River	1963	2	Full
23	D	7	John Day	1963	1	Full

1964 European Pine Shoot Moth Survey in Oregon (Continued)

Number	Location		Town	Last Survey	Man Days Needed	Type Coverage
24	D	5	Madras	1963	1	Full
25	H	2	Medford	1963	5	Full
26	B	8	Milton-Freewater	1962	1	Full
27	D	1	Newport	1962	2	Full
28	F	1	North Bend	1961	4	Full
29	B	7	Pendleton	1963	7	Full
30	G	1	Port Orford	1961	1	Full
31	D	5	Prineville	1963	2	Full
32	A	3	Rainier	1963	1	Full
33	D	5	Redmond	1963	1	Full
34	E	1	Reedsport	1961	2	Full
35	F	2	Roseburg	1963	4	Full
36	C	2	Salem	1962	12	Full
37	B	3	Scappoose	1963	1/2	Full
38	B	1	Seaside	1963	2	Full
39	E	2	Springfield	1963	3	Full
40	B	3	St. Helens	1963	2	Full
41	B	5	The Dalles	1963	2	Full
42	B	1	Tillamook	1961	2	Full
43	D	1	Waldport	1961	1	Full
44	A	1	Warrenton	1963	1	Full

GENERAL

Safety

Crew members will be expected to work safely in accordance with instructions in the "Forest Service Safety Handbook," a copy of which has been provided for each crew.

Administration

General instructions pertaining to work regulations and practices regarding use of Government cars will be provided for each crew. Crew members are expected to read and observe these practices. If you have any questions about these regulations and practices, they will be answered by the survey leader, P. W. Orr or John Wortendyke.